Amendments to Claims

This listing of claims will replace all prior revisions and listings of claims in this application.

Listing of Claims

1. (**Currently Amended**) A method comprising:

generating a phase-shift keyed optical signal; and

propagating the phase shift keyed optical signal through a semiconductor optical amplifier in deep saturation, wherein $-4dBm < P_{IN} < 4dBm$, such that an optical signal exhibiting a regulated, -amplified optical power is produced;

wherein the amplified optical power is regulated to a saturation output power such that $\Delta P_{OUT}(dB)/\Delta P_{IN}(dB)$ of the optical amplifier is less than about 0.25, wherein P_{OUT} is the power of the optical signal output from the amplifier, and P_{IN} is the power of the optical signal input into the amplifier.

2. (**Previously presented**) The method of claim 1, wherein the amplified optical power is regulated to about the saturation output power of the semiconductor optical amplifier.

3. (**Previsously Presented**) The method of claim 1, wherein a gain recovery time of the optical amplifier is larger than the bit period of the optical signal.

4. (**Original**) The method of claim 1, wherein the optical signal has a data-independent intensity profile.

5. (**Original**) The method of claim 1 wherein the optical signal is RZ-DPSK signal.

6. (**Original**) The method of claim 1, wherein the optical signal is an $\pi/2$-DPSK signal.

7. (**Original**) The method of claim 1, wherein the optical signal is a constant-intensity DPSK signal.

8. (**Original**) The method of claim 1, wherein the optical signal is an RZ-DQPSK signal.

9. (**Cancelled**)

10. (**Currently Amended**) A method for optical limiting amplification comprising:

inputting a phase-shift keyed optical signal having a data independent intensity profile into a semiconductor optical amplifier in a deep saturation regime wherein $-4\text{dBm} < P_{IN} < 4\text{dBm}$ such that an optical signal exhibiting a regulated, amplified optical power is produced and output, wherein $\Delta P_{OUT}(\text{dB})/\Delta P_{IN}(\text{dB})$ is less than about 0.25, where P_{OUT} is the power of the optical signal output from the amplifier, and P_{IN} is the power of the optical signal input into the amplifier.

11. (**Previously Presented**) The method of claim 10, wherein a gain recovery time of the optical amplifier is larger than the bit period of the optical signal.

12. (**Original**) The method of claim 10, wherein the optical signal is an RZ-DPSK signal.

13. (**Original**) The method of claim 10, wherein the optical signal is an $\pi/2$-DPSK signal.

14. (**Original**) The method of claim 10, wherein the optical signal is a constant-intensity DPSK signal.

15. (**Original**) The method of claim 10, wherein the optical signal is an RZ-DQPSK signal.

16.(**Withdrawn**)

17. (**Currently Amended**) An optical signal processor apparatus comprising:

a semiconductor optical amplifier device adapted to operate in deep saturation , wherein -4dBm < P_{IN} < 4dBm, and to receive an RZ-DPSK optical signal having an amplitude-shift keyed optical label portion, such that the optical label portion of the signal is removed upon propagation through the semiconductor optical amplifier device;

wherein ΔP_{OUT}(dB)/ ΔP_{IN}(dB) is less than about 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.

18. (**Withdrawn**)

19. (**Currently Amended**) An optical communication system for transmitting multi-channel phase-shift keyed optical signals comprising:

a plurality of semiconductor optical amplifiers,

wherein the system is adapted to transmit the optical signals such that the plurality of semiconductor optical amplifiers operate ~~in deep saturation amplifier~~ in a deep saturation regime wherein -4dBm < P_{IN} < 4dBm so as to provide optical power equalization of a plurality of channels of the multi-channel optical signals,

wherein ΔP_{OUT}(dB)/ ΔP_{IN}(dB) is less than about 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.

20. (**Currently Amended**) An apparatus comprising:

a means for generating a phase-shift keyed optical signal; and

a means for propagating the optical signal through a semiconductor optical amplifier in deep saturation wherein -4dBm < P_{IN} < 4dBm to regulate the amplified optical power;

wherein ΔP_{OUT}(dB)/ ΔP_{IN}(dB) is less than about 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.